ISSN 0704-3716

Canadian Translation of Fisheries and Aquatic Sciences

No. 5334

Ovarian structure and plasma steroid hormones of triploid female rainbow trout

M. Nakamura, Y. Nagahama, M. Iwahashi and M. Kojima

Original title: Nijimasu sanbaitai mesu no seishokusen to Ketchu suteroido horumon

In: Nippon Suisan Gakkaishi 53 (6): 1105, 1987/Bulletin of the Japenese Society for Scientific Fisheries 53 (6): 1105, 1987

Original language: Japanese

Available from:
Canada Institute for Scientific and Technical Information
National Research Council
Ottawa, Ontario, Canada K1A 0S2

1988

6 typescript pages

Secretary of State / Secrétariat d'État

90-01473/(

MULTILINGUAL SERVICES DIVISION – DIVISION DES SERVICES MULTILINGUES

TRANSLATION BUREAU BUREAU DES TRADUCTIONS

LIBRARY IDENTIFICATION – FICHE SIGNALÉTIQUE

Translated from - Traduction de	Into - En
Japanese	English

Author - Auteur

Masaru NAKAMURA, Yoshitaka NAGAHAMA, Masao IWAHASHI and Masao KOJIMA

Title in English or French - Titre anglais ou français

Ovarian Structure and Plasma Steroid Hormones of Triploid Female Rainbow Trout

Title in foreign language (Transliterate foreign characters)
Titre en langue étrangère (Transcrire en caractères romains)

Nijimasu Sanbaitai Mesu no Seishokusen to Ketchu Suteroido Horumon

Reference in foreign language (Name of book or publication) in full, transliterate foreign characters.
Référence en langue étrangère (Nom du livre ou publication), au complet, transcrire en caractères romains.

Nippon Suisan Gakkaishi

Reference in English or French - Référence en anglais ou français

Bulletin of the Japanese Society for Scientific Fisheries

Publisher - Editeur	DATE OF PUBLICATION / DATE DE PUBLICATION			Page Numbers in original / Numéros des pages dans l'original
–	Year / Année	Volume	Issue No. / Numéro	1105
Place of Publication / Lieu de publication			53 (6)	Number of typed pages / Nombre de pages dactylographiées
–	1987		1105	4

Requesting Department / Ministère-Client: DFO

Translation Bureau No. / Notre dossier nº: 3287267

Branch or Division / Direction ou Division: IPB

Translator (Initials) / Traducteur (Initiales): PS

Person requesting / Demandé par: Nancy Johnson

DEC - 7 1987

Your Number / Votre dossier nº: –

Date of Request / Date de la demande: November 13, 1987

UNEDITED TRANSLATION
For information only
TRADUCTION NON REVISEE
Information seulement

Canada

SEC 5-111 (84-10)

Department of the Secretary of State of Canada | Secrétariat d'État du Canada

MULTILINGUAL SERVICES DIVISION – DIVISION DES SERVICES MULTILINGUES

TRANSLATION BUREAU | BUREAU DES TRADUCTIONS

Client's No.–N° du client	Department – Ministère	Division/Branch – Division/Direction	City – Ville
	DFO	IPB	Ottawa
Bureau No.–N° du bureau	**Language – Langue**	**Translator (Initials) – Traducteur (Initiales)**	
3287267	Japanese	PS	DEC - 7 1987

Ovarian Structure and Plasma Steroid Hormones of Triploid Female Rainbow Trout [1)]

By

Masaru NAKAMURA[2)], Yoshitaka NAGAHAMA[3)], Masao IWAHASHI[4)] and Masao KOJIMA[4)]

Bulletin of the Japanese Society for Scientific Fisheries

It is well known that numerous triploid females salmonids are sterile[1-3)]. With regard to cultured fish, this presents numerous advantages. It is for example possible to stop the decline in growth that accompanies maturation and to avoid the death following spawning. In the present study, we made observations of the microstructure of the ovaries of rainbow trout having reached the maturity age. We also measured the plasma steroid hormones. The individuals used as specimens had been reared for a long period of time (21-27 months) and were triploid fish obtained through the high-temperature treatment (immersing for 6-10 min. at 26-30°C 10 min. after insemination) of fertilized eggs.

---

1) A summary of the present study was presented at the 1986 Spring Convention of the Japanese Society for Scientific Fisheries.

2) Faculty of Medicine, Teikyo University, Tokyo 192-03, Japan.

3) National Institute for Basic Biology, Okazaki 444, Japan.

4) Niigata Prefecture Inland Water Fisheries Experimental Station Koide 946, Japan.

UNEDITED TRANSLATION
For information only
TRADUCTION NON REVISEE
Information seulement

SEC 5-25 (86-02)

Canada

The ovaries in the group of control diploid mature females consisted in July of small eggs at the early yolk-forming stage and were occupied in October by large eggs at the late yolk-forming stage. In January the yolk-forming was completed and we saw individuals about to ovulate as well as others that were ovulating. The gonadosomatic index (GSI) increases suddenly along with maturation (0.80 ~ 13.81). Contrarily, we saw no oocytes at all that were enlarged or developed beyond the marginal fertile* stage in any of the triploid individuals observed. In the ovarian lamellae, we saw numerous cysts containing many immature reproductive cells, and saw often at the center images of reproductive cell regression. This is why the GSI too are remarkably low viz. 0.02 ~ 0.03 (Table 1). The electron microscopic observations revealed a synaptonemal structure in the nuclei of numerous reproductive cells (Fig. 1). The reproductive cells were therefore confirmed to be oocytes at the stage preceding the first meiosis. This differs from the reports stating that no oocytes are observed in the ovaries of female triploid rainbow trouts.[2)]

The changes in plasma steroid hormones volume within the group of mature diploid individuals agreed well with the results known thus far for rainbow trout. Estradiol-17 β (E_2) is high at the July and October yolk-forming periods. In January it was high in those individuals at the stage preceding ovulation. It was low and scattered among the ovulating individuals (12.88~15.73 ng/mL). Testosterone (T) rose at the yolk-forming period. It rose further again at the maturation period (9.37 ~ 42.46 ng/mL). At the yolk-forming stage

---

*Translator's note: a guess; there seems to be a typographic error in the text.

17α, 20β-dihydroxy-4-pregnen-3-one (17α, 20β-diOHprog) thought to be a hormone inducing egg maturation among salmonids was low and rose remarkably at the egg-deposition period (0.23 ~ 2.71 ng/mL). The volumes of plasma E_2, T, 17α, 20β-diOHprog in the triploid individuals were 0.23 ~ 0.61, 0.69 ~ 1.71, 0.17 ~ 0.42 ng/mL and in all cases remarkably lower than among mature diploid individuals (Table 1).

One of the main reasons for the sterility of female triploids seems to be that the chromosomes do not become detached at the pairing stage of the first maturation cleavage. The present study demonstrated that the drop in steroid hormone secretion could also be one factor.

Bibliography

文　　献

1) T. Benfey and A. M. Sulterlin: *Can. J. Fish. Aguat, Sci.*, **41**, 1387-1392 (1984).
2) R. F. Lincoln and A. P. Scott: *J. Fish Biol.*, **25**, 385-392 (1984).
3) I. I. Solar, Donaldson, E. M. and Hunter, G. A.: *Aquaculture*, **42**, 57-67 (1984).

UNEDITED TRANSLATION
For information only
TRADUCTION NON REVISEE
Information seulement

Table 1: Gonadosomatic index and steroid hormones levels in the plasma of diploid and triploid females

Month	Ploid	No.	GSI (%)	Estradiol-17β (ng/ml)	Testosterone (ng/ml)	17α,20β-Dihydroxy-4-pregnen-3-one (ng/ml)
July	Diploid	4	0.80±0.20*	12.88±3.80	9.37± 2.08	0.23±0.01
	Triploid	1	0.02	0.39	1.22	0.17
October	Diploid	5	4.30±0.80	15.29±1.94	18.60± 1.98	0.52±0.10
	Triploid	8	0.03±0.01	0.23±0.01	0.69± 0.01	0.22±0.02
January	Diploid	5	3.81±1.66	15.73±9.89	42.46±10.75	2.71±1.15
	Triploid	4	0.03±0.00	0.61±0.15	1.71± 0.55	0.42±0.13

* Standard error.

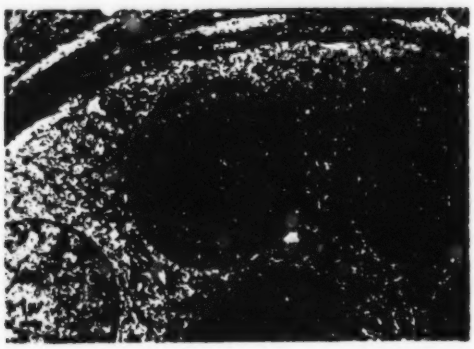

Fig. 1: Electron micrograph of the ovary in triploid fish. Synaptonemal complexes are seen in the nuclei of oocytes.